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SOLAR/2011-79/05

Monthly Performance Report

TERRELL D. MOSELEY

MAY 1979

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT
TERRELL D. MOSELEY
MAY 1979

I. SYSTEM DESCRIPTION

The Terrell D. Moseley Co. site is a 1,780-square foot, single story, commercial office building with attached warehouse in Lynchburg, Virginia. The solar energy system is designed to provide approximately 70 percent of the space heating and hot water energy requirements of the office building. Because the hot water consumption is very low (nominally 10 gallons per day), only the space heating system is monitored for performance evaluation. The site has a collector array of 24 flat-plate collector panels built by T. D. Moseley. The collector array has a gross area of 400 square feet, and faces south at a tilt angle of 50 degrees from the horizontal. Water is the heat transfer medium throughout the solar energy system. Collected solar energy is delivered to the 2,000-gallon storage tank, which is in an unheated attached warehouse building. The insulation on the tank is four inches of fiberglass.

When solar energy is insufficient to maintain a nominal 105°F storage temperature, a natural gas-fired boiler (auxiliary heater) provides additional energy to storage. Space heating is provided by circulating storage water through a heat exchanger located in the air distribution system of the building. Since the collector fluid automatically drains into storage after each solar energy collection operation, additional collector freeze protection measures are not required.

The system, shown schematically in Figure 1, has three modes of solar operation, which are described below.

Mode 1 - Collector-to-Storage: This mode is entered when the collector absorber plate temperature exceeds the bottom storage temperature by 20°F. The transfer fluid is pumped from storage through the collectors

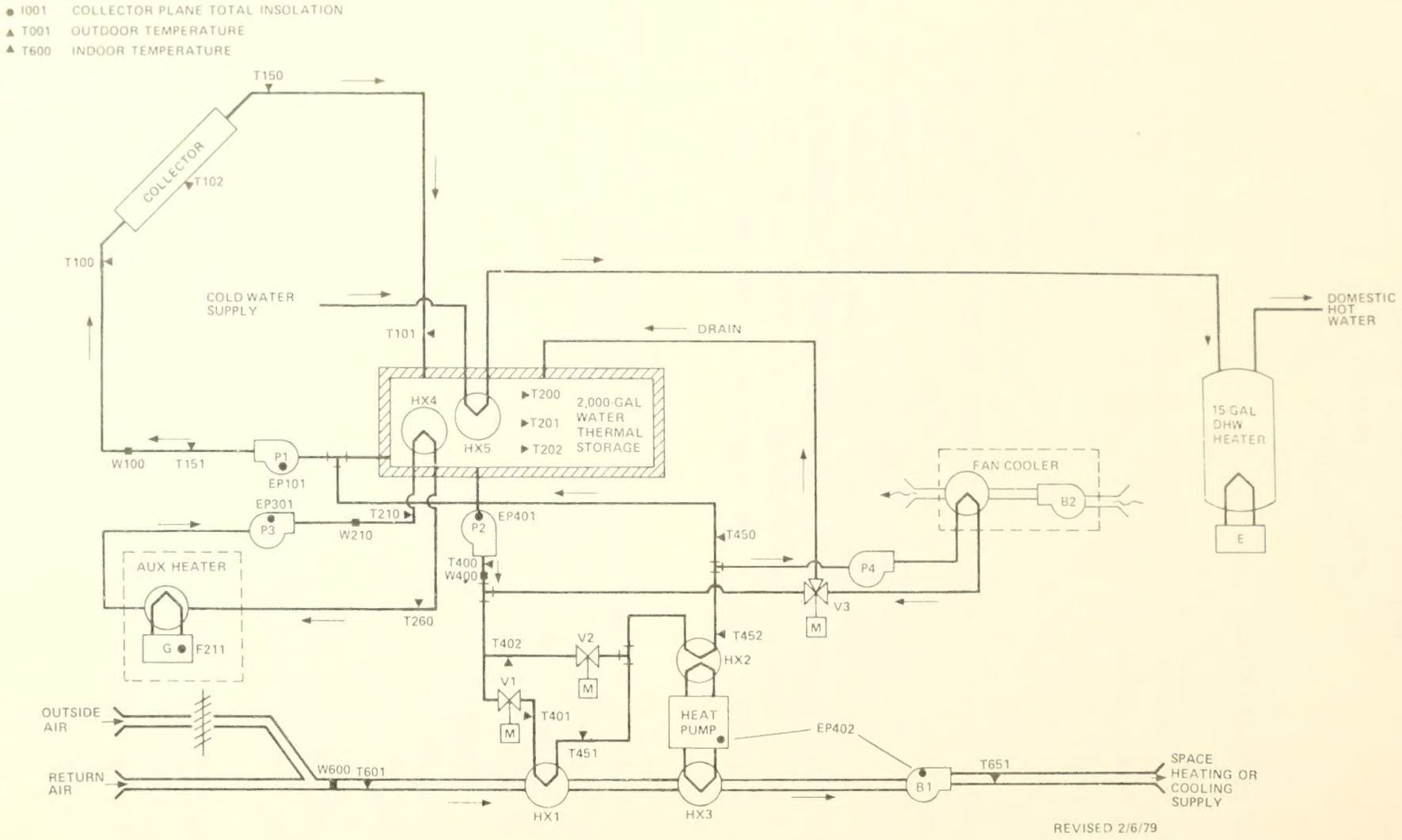

Figure 1. T. D. MOSELEY SOLAR ENERGY SYSTEM SCHEMATIC

and back to storage until this temperature differential drops to less than a nominal 3°F.

Mode 2 - Storage-to-Space Heating: This mode is entered when there is a demand for space heating and the sensed temperature of the storage water is greater than a nominal 85°F. Water is circulated between storage and liquid-to-air heat exchanger HX1 in the air-handling unit distribution duct until the space heating demand is satisfied, or the sensed storage temperature drops below 85°F.

Mode 3 - Storage-to-Heat Pump: This mode of operation will provide space heating when Mode 2 operation is not available. This mode is entered when there is a demand for space heating and the temperature of the storage water is below 85°F. Energy input to the heat pump is supplied by opening the normally closed valve V2, closing the normally open valve V1, and circulating storage water through heat pump evaporator HX2. This mode is terminated when either the sensed storage temperature rises above 90°F, or when no space heating demand exists.

II. PERFORMANCE EVALUATION

The system performance evaluations discussed in this section are based primarily on the analysis of the data presented in the attached computer-generated monthly report. This attached report consists of daily site thermal and energy values for each subsystem, plus environmental data. The performance factors discussed in this report are based upon the definitions contained in NBSIR 76-1137, Thermal Data Requirements and Performance Evaluation Procedures for the National Solar Heating and Cooling Demonstration Program.

A. Introduction

Due to the low demand for space heating at the T. D. Moseley site, reported system performance for May is not indicative of nominal system performance. The solar energy system was operational throughout May and satisfied 96 percent of the space heating energy requirements. The

reported solar energy system savings were computed to be 0.06 million Btu of fossil fuel energy, at the expense of 0.38 million Btu of electrical operating energy. However, the major portion of this operating expense is attributable to the DHW subsystem, not the space heating subsystem. The DHW subsystem operation is not monitored for performance evaluation.

B. Weather

The long-term average outside ambient temperature for May in Lynchburg, Virginia is 65°F. The measured average outside ambient temperature was also 65°F. The measured insolation in the plane of the collector array averaged 1,254 Btu/ft^2-day, which is 22 percent below normal for the area. The long-term average is 1,612 Btu/ft^2-day. Long-term average temperature data and long-term average insolation data are taken or derived from the Monthly Environmental Data for Systems in the National Solar Data Network, Department of Energy Report SOLAR/0019-79/36.

C. System Thermal Performance

Collector - Of the 15.55 million Btu of solar energy incident on the collector array during May, 11.75 million Btu were incident on the array when the collector pump P1 (Figure 1) was operating. The system collected 2.47 million Btu, or 16 percent of the total insolation incident on the collector array. The operational collector array efficiency, which is only computed during collector pump operation, was 21 percent. In addition to collecting energy, the array rejected 0.22 million Btu from storage as a result of collector pump operation during periods of insufficient insolation levels. This amount of rejected energy is included in the performance calculations for solar-energy-collected, energy-to-storage, and collector array efficiency. The operation of pump P1 required 0.38 million Btu.

Storage - The solar energy system delivered 2.16 million Btu to storage during May. There was an apparent transport energy loss of 0.31 million Btu between the collectors and storage. The auxiliary heater did not supply any auxiliary thermal energy to storage. A total of 0.04 million Btu

was extracted from storage during the month and sent to the conditioned space. The average storage temperature was 133°F. The calculations of the storage efficiency parameter were invalid due to the zero or small amount of energy removed from storage for space heating each day. Therefore, daily values for the storage efficiency parameter are not tabulated in the storage performance report. The energy loss from storage was 2.15 million Btu, which was computed by subtracting the sum of the change in storage energy (-0.03 million Btu) and the energy removed from storage from the total thermal energy delivered to storage (2.16 million Btu). The amount of energy supplied to the domestic hot water (DHW) subsystem is included in this energy loss calculation because the DHW subsystem is not instrumented for performance evaluation.

Space Heating Load - The space heating load for May was calculated to be 0.04 million Btu. Solar energy satisfied 96 percent of the space heating load. No auxiliary thermal energy was supplied to the space heating subsystem via the storage tank through the operation of the auxiliary heater. The electrical energy needed to operate pump P2 and blower B1 was insignificant.

D. Observations

The collector array efficiency and the storage tank efficiency were low because of the losses due to the high average storage tank temperature, 133°F, during May. The solar energy system was originally designed for water temperatures between 50°F and 120°F.

E. Energy Savings

The T. D. Moseley solar energy system provided savings of 0.06 million Btu of natural gas during May, at the expense of 0.38 million Btu of electricity for operating the solar portion of the system. The reported savings are not representative of the nominal space heating system savings because the space heating demand was very low.

III. ACTION STATUS

The standby operation of the pilot light for the auxiliary gas heater was discontinued on May 2 to save natural gas.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MOSELEY
REPORT PERIOD: MAY,1979

SOLAR/2011-79/05

SITE/SYSTEM DESCRIPTION:
T. D. MOSELEY SOLAR ENERGY SYSTEM IS DESIGNED TO PROVIDE HEATING FOR A 1,780 SQUARE FOOT OFFICE BUILDING. ENERGY COLLECTION AND STORAGE IS PROVIDED BY A 400 SQUARE FOOT FLAT-PLATE COLLECTOR ARRAY AND A 2,000 GALLON STORAGE TANK. WATER IS USED AS THE HEAT COLLECTION, TRANSFER, AND STORAGE FLUID. SPACE HEATING IS PROVIDED BY A WATER/AIR HEAT EXCHANGER LOCATED IN THE AIR HANDLER UNIT DUCTING. A NATURAL GAS-FIRED BOILER PROVIDES THERMAL ENERGY TO STORAGE TO SUPPLEMENT SOLAR ENERGY.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	15.545 MILLION BTU
	38864 BTU/SQ.FT.
COLLECTED SOLAR ENERGY	2.469 MILLION BTU
	6173 BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	65 DEGREES F
AVERAGE BUILDING TEMPERATURE	73 DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.00
ECSS OPERATING ENERGY	0.378 MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.381 MILLION BTU
TOTAL ENERGY CONSUMED	2.894 MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	0.037	N.A.	0.037 MILLION BTU
SOLAR FRACTION	N.A.	96	N.A.	96 PERCENT
SOLAR ENERGY USED	N.A.	0.035	N.A.	0.035 MILLION BTU
OPERATING ENERGY	N.A.	0.003	N.A.	0.381 MILLION BTU
AUX. THERMAL ENERGY	N.A.	0.002	N.A.	0.002 MILLION BTU
AUX. ELECTRIC FUEL	N.A.	0.000	N.A.	0.000 MILLION BTU
AUX. FOSSIL FUEL	N.A.	0.043	N.A.	0.043 MILLION BTU
ELECTRICAL SAVINGS	N.A.	-0.001	N.A.	-0.379 MILLION BTU
FOSSIL SAVINGS	N.A.	0.059	N.A.	0.059 MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.028

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COCLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MOSELEY
REPORT PERIOD: MAY, 1979

SOLAR/2011-79/05

SITE/SYSTEM DESCRIPTION:
T. D. MOSELEY SOLAR ENERGY SYSTEM IS DESIGNED TO PROVIDE HEATING FOR A 1,780 SQUARE FOOT OFFICE BUILDING. ENERGY COLLECTION AND STORAGE IS PROVIDED BY A 400 SQUARE FOOT FLAT-PLATE COLLECTOR ARRAY AND A 2,000 GALLON STORAGE TANK. WATER IS USED AS THE HEAT COLLECTION, TRANSFER, AND STORAGE FLUID. SPACE HEATING IS PROVIDED BY A WATER/AIR HEAT EXCHANGER LOCATED IN THE AIR HANDLER UNIT DUCTING. A NATURAL GAS-FIRED BOILER PROVIDES THERMAL ENERGY TO STORAGE TO SUPPLEMENT SOLAR ENERGY.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	16.400 GIGA JOULES
	441335 KJ/SQ.M.
COLLECTED SOLAR ENERGY	2.605 GIGA JOULES
	70103 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	18 DEGREES C
AVERAGE BUILDING TEMPERATURE	23 DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.00
ECSS OPERATING ENERGY	0.399 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.402 GIGA JOULES
TOTAL ENERGY CONSUMED	3.053 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	0.039	N.A.	0.039 GIGA JOULES
SOLAR FRACTION	N.A.	96	N.A.	96 PERCENT
SOLAR ENERGY USED	N.A.	0.037	N.A.	0.037 GIGA JOULES
OPERATING ENERGY	N.A.	0.003	N.A.	0.402 GIGA JOULES
AUX. THERMAL ENG	N.A.	0.002	N.A.	0.002 GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	0.000	N.A.	0.000 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	0.045	N.A.	0.045 GIGA JOULES
ELECTRICAL SAVINGS	N.A.	-0.001	N.A.	-0.400 GIGA JOULES
FOSSIL SAVINGS	N.A.	0.062	N.A.	0.062 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.028

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: MOSELEY
REPORT PERIOD: MAY,1979

SOLAR/2011-79/05

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.803	59	0.006	0.000	0.018	N	0.007
2	0.770	61	0.012	0.000	0.018	O	0.014
3	0.212	64	0.000	0.000	0.001	T	0.000
4	0.231	65	0.006	0.000	0.006		0.026
5	0.735	58	0.000	0.000	0.018	A	0.000
6	0.613	62	0.000	0.000	0.018	P	0.000
7	0.619	68	0.000	0.000	0.017	P	0.000
8	0.670	73	0.000	0.000	0.018	L	0.000
9	0.343	73	0.000	0.000	0.008	I	0.000
10	0.464	73	0.000	0.000	0.015	C	0.000
11	0.534	70	0.011	0.000	0.013	A	0.020
12	0.403	71	0.000	0.000	0.007	B	0.000
13	0.301	67	0.000	0.000	0.009	L	0.000
14	0.275	61	0.000	0.000	0.005	E	0.000
15	0.704	64	0.002	0.000	0.018		0.002
16	0.763	63	0.000	0.000	0.018		0.000
17	0.784	59	0.000	0.000	0.017		0.000
18	0.696	61	0.000	0.000	0.018		0.000
19	0.370	60	0.000	0.000	0.004		0.000
20	0.561	65	0.000	0.000	0.016		0.000
21	0.208	63	0.000	0.000	0.000		0.000
22	0.328	65	0.000	0.000	0.011		0.000
23	0.303	70	0.000	0.000	0.009		0.000
24	0.223	66	0.000	0.000	0.003		0.000
25	0.638	59	0.000	0.000	0.017		0.000
26	0.470	54	0.000	0.000	0.011		0.000
27	0.370	61	0.000	0.000	0.009		0.000
28	0.465	64	0.000	0.000	0.013		0.000
29	0.698	67	0.000	0.000	0.019		0.000
30	0.714	68	0.000	0.000	0.017		0.000
31	0.276	70	0.000	0.000	0.006		0.000
SUM	15.545	-	0.037	0.000	0.378	N.A.	-
AVG	0.501	65	0.001	0.000	0.012	N.A.	0.002
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: MOSELEY
REPORT PERIOD: MAY, 1979

SOLAR/2011-79/05

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.803	0.720	0.177	69	0.220
2	0.770	0.679	0.166	71	0.215
3	0.212	0.036	0.002	67	0.011
4	0.231	0.097	-0.001	66	-0.006
5	0.735	0.662	0.162	63	0.221
6	0.613	0.531	0.092	69	0.150
7	0.619	0.522	0.111	76	0.180
8	0.670	0.594	0.144	81	0.215
9	0.343	0.153	0.007	79	0.021
10	0.464	0.361	0.069	79	0.148
11	0.534	0.461	0.146	84	0.273
12	0.403	0.234	0.063	76	0.157
13	0.301	0.192	0.019	75	0.064
14	0.275	0.097	0.005	62	0.019
15	0.704	0.642	0.187	76	0.266
16	0.763	0.674	0.164	71	0.215
17	0.784	0.682	0.159	69	0.203
18	0.696	0.606	0.110	73	0.158
19	0.370	0.156	0.016	64	0.044
20	0.561	0.462	0.072	73	0.129
21	0.208	0.000	0.000	67	0.000
22	0.328	0.190	-0.003	71	-0.009
23	0.303	0.161	0.013	73	0.044
24	0.223	0.050	0.003	68	0.012
25	0.638	0.527	0.106	66	0.167
26	0.470	0.295	0.011	57	0.023
27	0.370	0.215	0.029	67	0.079
28	0.465	0.376	0.078	69	0.167
29	0.698	0.626	0.186	78	0.267
30	0.714	0.625	0.173	78	0.242
31	0.276	0.120	0.001	72	0.004
SUM	15.545	11.747	2.469	-	-
AVG	0.501	0.379	0.080	71	0.159
NBSID	Q001		Q100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: MOSELEY
REPORT PERIOD: MAY,1979

SOLAR/2011-79/05

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.161	0.006	0.095	136	*
2	0.144	0.012	0.040	141	*
3	-0.004	0.000	-0.116	138	*
4	-0.018	0.006	-0.090	131	*
5	0.136	0.000	0.099	132	*
6	0.072	0.000	0.010	135	*
7	0.091	0.000	0.031	137	*
8	0.121	0.000	0.066	140	*
9	0.007	0.000	-0.093	139	*
10	0.059	0.000	-0.020	135	*
11	0.135	0.011	0.023	136	*
12	0.059	0.000	-0.013	136	*
13	0.008	0.000	-0.054	134	*
14	0.002	0.000	-0.078	129	*
15	0.175	0.002	0.088	130	*
16	0.160	0.000	0.096	136	*
17	0.148	0.000	0.062	141	*
18	0.102	0.000	0.022	144	*
19	0.021	0.000	-0.084	142	*
20	0.059	0.000	0.005	139	*
21	0.000	0.000	-0.121	134	*
22	-0.012	0.000	-0.055	130	*
23	0.009	0.000	-0.039	126	*
24	-0.000	0.000	-0.070	123	*
25	0.097	0.000	0.058	123	*
26	0.015	0.000	-0.039	123	*
27	0.019	0.000	-0.021	121	*
28	0.070	0.000	0.034	121	*
29	0.171	0.000	0.130	127	*
30	0.163	0.000	0.098	134	*
31	-0.010	0.000	-0.094	134	*
SUM	2.160	0.037	-0.033	-	-
AVG	0.070	0.001	-0.001	133	0.002
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: MOSELEY
REPORT PERIOD: MAY, 1979

SOLAR/2011-79/05

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR. OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.006	94	0.006	0.001	0.000	0.000	0.025	-0.000	0.009	71	59
2	0.012	95	0.011	0.001	0.001	0.000	0.013	-0.000	0.018	72	61
3	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	73	64
4	0.006	95	0.006	0.001	0.000	0.000	0.000	-0.000	0.010	73	65
5	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70	58
6	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	69	62
7	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	73	68
8	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	76	73
9	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	78	73
10	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	76	73
11	0.011	97	0.011	0.001	0.000	0.000	0.000	0.000	0.018	76	70
12	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	73	71
13	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71	67
14	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	72	61
15	0.002	98	0.001	0.000	0.000	0.000	0.000	-0.000	0.002	73	64
16	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	63
17	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	59
18	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	61
19	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	72	60
20	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71	65
21	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	63
22	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	73	65
23	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75	70
24	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75	66
25	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	59
26	0.000	0	0.000	0.000	0.000	0.000	0.005	0.000	0.000	69	54
27	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68	61
28	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	72	64
29	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	67
30	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75	68
31	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74	70
SUM	0.037	-	0.035	0.003	0.002	0.000	0.043	-0.001	0.059	-	-
AVG	0.001	96	0.001	0.000	0.000	0.000	0.001	-0.000	0.002	73	65
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: MOSELEY
REPORT PERIOD: MAY,1979

SOLAR/2011-79/05

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	2008	N	59	69	N	N	N
2	1925	O	61	71	O	O	O
3	530	T	64	67	T	T	T
4	578		65	66			
5	1838	A	58	63	A	A	A
6	1533	P	62	69	P	P	P
7	1547	P	68	76	P	P	P
8	1676	L	73	81	L	L	L
9	858	I	73	79	I	I	I
10	1159	C	73	79	C	C	C
11	1336	A	70	84	A	A	A
12	1008	B	71	76	B	B	B
13	752	L	67	75	L	L	L
14	687	E	61	62	E	E	E
15	1760		64	76			
16	1908		63	71			
17	1960		59	69			
18	1740		61	73			
19	924		60	64			
20	1402		65	73			
21	519		63	67			
22	820		65	71			
23	759		70	73			
24	559		66	68			
25	1596		59	66			
26	1174		54	57			
27	925		61	67			
28	1163		64	69			
29	1746		67	78			
30	1785		68	78			
31	691		70	72			
SUM	38864	N.A.	-	-	-	-	-
AVG	1254	N.A.	65	71	N.A.	N.A.	N.A.
NBS ID	Q001		N113			N115	N114

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

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